

CONTROL AREA WORKSHEET:

- 1) Will there be any hazardous materials stored or used within the building? _____ (YES or NO)
If "**NO**" then the remainder of the worksheet does not have to be completed.

If "**YES**" proceed to question 2.

- 2) Will this building be designed as a Group H occupancy? _____ (YES or NO)
If "**NO**" then the remainder of the worksheet starting at question 3 must be completed.

If "**YES**", complete the "Control Area Sub-worksheet" and answer question 2a. The completion of the remainder of the worksheet is not required.

- 2a) Are the quantities of hazardous materials provided within column 6 of the Control Area Sub-worksheet greater than the quantities permitted in Tables 307.7(1) or 307.7(2) shown in column 7 of the Control Area Sub-worksheet? _____ (YES, NO OR N/A)

- 3) Will this building be divided into control areas? _____ (YES or NO)
If "**YES**" complete the "Control Area Table" and the "Control Area Sub-worksheet".

If "**NO**", complete the "Control Area Sub-worksheet" and answer question 3a.

- 3a) Are the quantities of hazardous materials provided within column 6 of the Control Area Sub-worksheet greater than the quantities permitted in Tables 307.7(1) or 307.7(2) shown in column 7 of the Control Area Sub-worksheet? _____ (YES, NO OR N/A)

- 4) "Control Area Table" is completed and attached? _____ (YES or NO)

- 5) "Control Area Sub-worksheet" is completed and attached? _____ (YES or NO)

CONTROL AREA TABLE:

[illegible]

**INSTRUCTIONS FOR
CONTROL AREA WORKSHEET:**

There are several factors that need to be taken into account to determine whether a building or portion thereof is required to be classified as a Group H occupancy.

Question 1 is basic information that must be provided for each building to determine if any hazardous materials are stored or used within the building. It is recommended that Tables 307.7(1) and 307.7(2) in the IBC be referenced to determine if any of the materials within the tables are present in the building. **PLEASE BE FOREWARNED THAT FAILURE TO CORRECTLY IDENTIFY THE MATERIALS TO THE PLAN EXAMINER AT THE TIME OF REVIEW AND APPROVAL OF THE BUILDING PLANS COULD RESULT IN CODE VIOLATIONS AT A LATER STAGE IN THE CONSTRUCTION PROCESS AND ALSO POSSIBLY RESULTING IN DESIGN MODIFICATIONS BEING REQUIRED.** The plan examiner can only base their review on the information presented to them at the time of plan review. Generally cost of design modification is less, the earlier it is done in the design process.

If a "NO" response is provided for question 1 there is no need to complete the remainder of this worksheet. The remainder of this worksheet deals with the presence of hazardous materials within the building.

If a "YES" response is provided to question 1 then proceed to question 2.

Question 2 provides information on how the building will be designed. It was established from question 1 and the Materials Table that hazardous materials will be present in the building.

If a "NO" response is provided for question 2 then the remainder of the worksheet must be completed starting with question 3.

If a "YES" response is provided to question 2 then a response is required for question 2a, completion of the "Control Area Sub-worksheet" must be provided in order to properly determine the type of hazardous materials present and the amounts of hazardous materials in storage, used in closed systems and used in open systems. A "YES" response to question 2a means that the building must be designed to comply with all requirements of section 415 of the IBC.

*A "NO" response to question 2a means that the building may be designed to comply with all requirements of section 414 **OR** 415 of the IBC.*

Question 3 provides additional information as to how the building will be designed.

If a "YES" response is provided to question 3 then the control area table and the remainder of the worksheet must be completed.

If a "NO" is provided to question 3 then a response to question 3a is required.

A **"YES"** response to question 3a means that the building must be designed to comply with all requirements of section 415 of the IBC.

A **"NO"** response to question 3a means that the building may be designed to comply with all requirements of section 414 **OR** 415 of the IBC.

Questions 4 and 5 provides information on what additional tables and worksheets are included with this worksheet.

The following table is a portion of the "Control Area Table":

CONTROL AREA TABLE:

Floor level above or below grade in which material is stored or used	Number of control areas per floor	Permitted number of control areas per floor (from Table 414.2.2)	Fire resistive rating of fire barriers used to define control areas	Required fire resistive ratings for fire barriers (from Table 414.2.2)	Hazardous materials on floor level	Permitted % of the maximum allowable quantity of material per control area from Table 414.2.2

Column one of the Control Area Table provides information on the floor level location of where the hazardous material is stored or is being used. The values entered in the cells of this column are the floor levels above or below grade as applicable in which the hazardous materials are located. Each floor level that has hazardous material located on such must be indicated in this column as a separate entry.

The second column in the Control Area Table is titled "Number of control areas per floor" and provides the information on the number of control areas provided on the applicable floor.

The information required in column three titled "Permitted number of control areas per floor" is obtained directly from Table 414.2.2 of the IBC. The value provided in column two should not be greater than the value provided within column three. If the value in column two is greater than the value in column three then the building must be designed to comply with all requirements of section 415 of the IBC or the control areas need to be redesigned.

The fourth column of the Control Area Table provides information on the fire resistive rating of the fire barriers used to define the control areas. Control areas are encapsulated by fire resistive rated fire barriers. When the fire resistive ratings of the vertical assemblies differ from the fire resistive ratings of the horizontal assemblies, the lower of the fire resistive ratings should be entered within the table.

The information required in column five is obtained directly from Table 414.2.2 of the IBC. The value within column four should not be less than the value provided within column five. If the value in column four is less than the value in column five, then the building must be designed to comply with all requirements of section 415 of the IBC or the fire resistive ratings of the control areas need to be redesigned.

The information in column six is the list of all hazardous materials in each control area for the designated floor level, may be multiple materials.

The information required in column seven is obtained directly from Table 414.2.2 of the IBC. The values within column seven also have to be provided in column nine of the "Control Area Sub-worksheet".

CONTROL AREA SUB-WORKSHEET:

[illegible]

INSTRUCTIONS FOR
CONTROL AREA SUB-WORKSHEET:

The control area sub-worksheet provides information on each individual control area. The following table is a portion of the control area sub-worksheet table:

CONTROL AREA SUB-WORKSHEET:

Designation of control area (floor level & location on floor)	Materials located within control area	Amount of materials in storage (gallons, pounds, & gas)	Amount of materials used in closed systems (gallons, pounds, & gas)	Amount used in open systems (gallons, pounds, & gas)	Total of each material stored or used in designated control area	Maximum amount of materials permitted (from Tables 307.7(1) and 307.7(2) of the IBC)	Actual % of the materials within the control area (column 6 divided by column 7)	Permitted % of the maximum allowable quantity of material per control area (same as column 7 of Control Area Table)

The first column in the Control Area Sub-worksheet provides information on the location and designation of the control areas within the building. The entries in this column should include the floor level and a designation for all of the control areas on the floor and in the building. All control areas for the project must be accounted for in this column.

The second column within the sub-worksheet table provides information on the materials that are located within the building and each of the control areas. Building owner in consultation with building designer will need to identify what materials will be in the building. Controlled materials are obtained directly from Tables 307.7(1) and 307.7(2) of the IBC. Please note that only the materials present in the building for storage or for use must be entered in the Table.

The third column in the Sub-worksheet table titled “Amount of Material in Storage” provides information on the actual amount of the hazardous material that is in storage.

The fourth column in the Sub-worksheet table titled “Amount of Materials Used in Closed Systems” provides information on the actual amount of the hazardous material that is used in a closed system. A closed system is defined in section 307.2 of the IBC as the use of a hazardous material involving a closed vessel or system that remains closed during normal operations. The vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations.

The fifth column in the Sub-worksheet table titled “Amount of Material Used in Open Systems” provides information on the actual amount of the hazardous material that is used in an open system. An open system is defined in section 307.2 of the IBC as the use of a hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations. The vapors emitted by the product are liberated outside of the vessel or system or the product is exposed to the atmosphere during normal operations.

The sixth column in the Sub-worksheet table is the total amount of hazardous materials provided in the building. The values entered in the cells of this column are the sum of the values of columns 3, 4, and 5.

Please be reminded that in addition to checking the total amount of hazardous materials within the control area, the amount of hazardous material for each use within the control area must also be checked. This "Control Area Sub-worksheet" only looks at the combined capacity of the hazardous materials and does not do a check on the amount of hazardous materials based on the use of the materials. **The values within columns 3, 4, and 5 should be less than the associated values of Tables 307.7(1) and 307.7(2) for the hazardous materials and its use. If any of the values within columns 3, 4 or 5 are greater than the associated values within Tables 307.7(1) or 307.7(2), the building must be designed to comply with all requirements of section 415 of the IBC or the control areas need to be redesigned.**

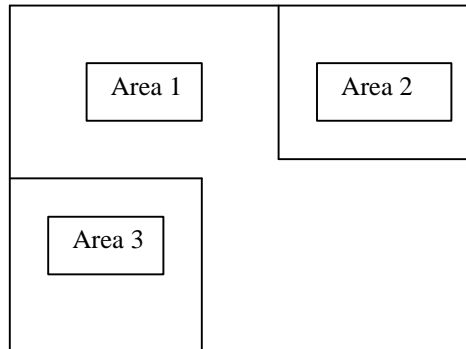
The information required in column seven titled "Maximum amount of materials permitted" is obtained directly from Tables 307.7(1) and 307.7(2) of the IBC. The value entered in column six must be less than the value provided in column seven. If the value in column six is greater than the value in column seven then the building/control area must be designed to comply with all requirements of section 415 of the IBC or the control areas need to be redesigned. It is important to read all of the footnotes associated with the tables in the IBC as these provide information when the tabular values can be exceeded and when additional limitations are imposed. For example, if a flammable liquid of class IA is in storage with a capacity of 20 gallons and in use in an open system with a capacity of 10 gallons, then the actual amount of materials within the control area would be 30 gallons. As per footnote b, of Table 307.7(1) the aggregate quantity of hazardous materials in utilization and storage shall not exceed the quantity listed for storage. In this example, the maximum permitted amount of material would be 30 gallons.

Column eight is the ratio, expressed as a percentage, of the actual amount of hazardous material within the control area (column 6) divided by the permitted amount of hazardous materials (column 7). The ratio should be expressed as a percentage. A percentage value must be entered in the cells of this column for each type of hazardous material provided within the control area.

Column nine is the permitted percentage of the maximum allowable quantity of hazardous materials per control area. The information required in column nine is obtained directly from the third column of Table 414.2.2 of the IBC. The percentages within column 8 should not exceed the percentages within column 9. If the percentage in column 8 is greater than the percentage in column 9, then the building must be designed to comply with the requirements of section 415 of the IBC or the control areas need to be redesigned. The information within this column is also to be provided within column seven of the Control Area Table.

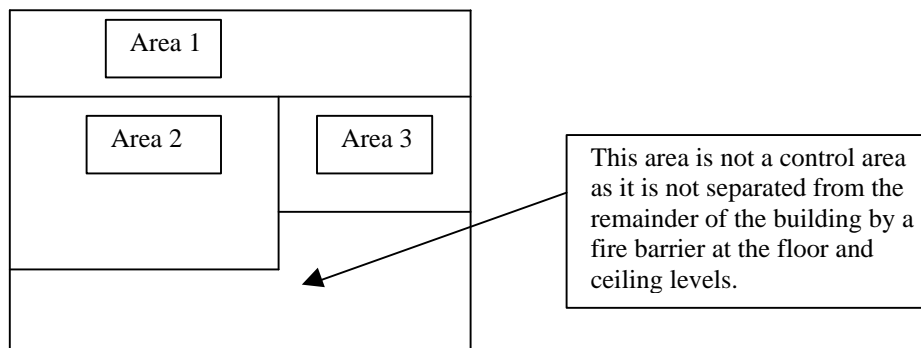
CONTROL AREA EXAMPLE:

Four story building (all above grade),
 Group F-1 occupancy,
 Completely protected by an automatic sprinkler system per 903.3.1.1 of the IBC,
 Type IIB construction, and
 All materials are stored in containers that do not comply with the cabinet exception requirements of IFC.

First floor plan:

Material	Control area 1	Control area 2	Control area 3
Flammable liquid – Class IA	Storage 50 gallons Open system 15 gallons	Storage 45 gallons Open system use 5 gallons	Storage 90 gallons
Organic peroxide – Class II	Storage 80 pounds Closed system 85 pounds	Storage 50 pounds	Storage 30 pounds Closed system 30 pounds
Oxidizer – Class 2	Storage 200 pounds Open system 90 pounds	Open system 80 pounds	Storage 300 pounds

Second and third floor levels have no control areas and have no hazardous materials present on such floor levels.

Fourth floor plan:

Material	Control area 1	Control area 2	Control area 3
Flammable liquid	Storage 10 gallons	Storage 5 gallons	Storage 2 gallons

– Class IA	Open system 4 gallons		Open system 2 gallons
Organic peroxide – Class II	Storage 45 pounds Closed system 20 pounds	Closed system 10 pounds	Storage 35 pounds

Complete the "Control Area Worksheet":

CONTROL AREA WORKSHEET:

- 1) Will there be any hazardous materials stored or used within the building? YES (YES or NO)
If "**NO**" then the remainder of the worksheet does not have to be completed.

If "**YES**" complete the remainder of the worksheet.

Since the answer was a YES the next question on the worksheet must be answered.

- 2) Will this building be designed as an H occupancy Group? NO (YES or NO)

If "**NO**" then the remainder of the worksheet starting at question 3 must be completed.

With a NO response, question 2a does not apply and question 3 on the worksheet must be answered.

If "**YES**" answer question 2a, complete the "Control Area Sub-worksheet" and answer question 2a, and then the completion of the remainder

Not applicable to this example.

- 2a) Are the quantities of hazardous materials provided within column 6 of the Control Area Sub-worksheet greater than the quantities permitted in Tables 307.7(1) or 307.7(2) shown in column 7 of the Control Area Sub-worksheet? N/A (YES, NO OR N/A)

- 3) Will this building be divided into control areas? YES (YES or NO)

If "**YES**" complete the Control Area Table and the Control Area Sub-worksheet Table.

With a YES response, question 3a does not apply and the Control Area Table and the Control Area Sub-worksheet must be completed.

If "**NO**", complete the "Control Area Sub-worksheet" and answer question 3a.

- 3a) Are the quantities of hazardous materials provided within column 6 of the Control Area Sub-worksheet greater than the quantities permitted in Tables 307.7(1) or 307.7(2) shown in column 7 of the Control Area Sub-worksheet? N/A (YES, NO OR N/A)

Not applicable.

- 4) "Control Area Table" is completed and attached? YES (YES or NO)

- 5) "Control Area Sub-worksheet" is completed and attached? YES (YES or NO)

CONTROL AREA TABLE:

Floor level above or below grade in which material is stored or used	Number of control areas per floor	Permitted number of control areas per floor (from Table 414.2.2)	Fire resistive rating of fire barriers used to define control areas	Required fire resistive ratings for fire barriers (from Table 414.2.2)	Hazardous materials on floor level	Permitted % of the maximum allowable quantity of material per control area from Table 414.2.2
1	3	4	1 hour	1 hour	Flammable liquid – class IA, Oxidizer – class 2, & Oxidizer – class 2	100%, 100%, & 100%
4	3	2	1 hour	2 hour	Flammable liquid – class IA, & Organic peroxide – class II	12.5% & 12.5%

Note:

- * Values were only entered for the first and fourth floor levels of the building, as these were the only floor levels designed for storage or use of hazardous materials within the building.
- * The number of control areas provided for the fourth floor is greater than the number of control areas permitted for the fourth floor. Because of this, the building must be designed to comply with the requirements of section 415 of the IBC and classified as a Group H occupancy or the number of control areas on this floor needs to be reduced.
- * The fire resistive ratings of the barriers used to define the control areas are of 1-hour fire resistive rated construction. This is less than the required 2-hour fire resistive ratings for fire barriers as posted in Table 414.2.2. Because of this, the building must be designed to comply with the requirements of section 415 of the IBC and classified as a Group H occupancy or the fire resistive ratings of the fire barriers need to be redesigned. Please also note that all supports of fire resistive rated construction shall also be constructed of the same hourly rating as the materials being supported.

CONTROL AREA SUB-WORKSHEET:

Designation of control area (floor level & location on floor)	Materials located within control area	Amount of materials in storage (gallons, pounds, & gas)	Amount of materials used in closed systems (gallons, pounds, & gas)	Amount used in open systems (gallons, pounds, & gas)	Total of each material stored or used in designated control area	Maximum amount of materials permitted (from Tables 307.7(1) and 307.7(2) of the IBC)	Actual % of the materials within the control area (column 6 divided by column 7)	Permitted % of the maximum allowable quantity of material per control area (same as column 7 of Control Area Table)
First floor – area 1	Flammable liquid – class IA	50 gallons		15 gallons	65 gallons	(30)(2) = 60 gallons	108.0 %	100 %
	Organic peroxide – class II	80 pounds	85 pounds		165 pounds	50(2) = 100 pounds	165.0 %	100%
	Oxidizer – class 2	200 pounds	90 pounds		290 pounds	250(2) = 500 pounds	58.0 %	100 %
First floor – area 2	Flammable Liquid – class IA	45 gallons		5 gallons	50 gallons	(30)(2) = 60 gallons	83.3 %	100 %
	Organic peroxide – class II	50 pounds			50 pounds	(30)(2) = 60 pounds	83.3 %	100 %
	Oxidizer – class 2		80 pounds		80 pounds	250(2) = 500 lbs	16.0 %	100 %
First floor – area 3	Flammable liquid – class IA	90 gallons			90 gallons	(30)(2) = 60 gallons	150.0 %	100 %
	Organic peroxide – class II	30 pounds	30 pounds		60 pounds	50(2) = 100 pounds	60.0 %	100 %
	Oxidizer – class 2	300 pounds			300 pounds	250(2) = 500 lbs	60.0 %	100 %
Fourth floor – area 1	Flammable liquid – class IA	10 gallons		4 gallons	14 gallons	(30)(2) = 60 gallons	23.3 %	12.5 %
	Organic peroxide – class II	45 pounds	20 pounds		65 pounds	50(2) = 100 pounds	65.0 %	12.5 %
Fourth floor – area 2	Flammable liquid – class IA	5 gallons			5 gallons	(30)(2) = 60 gallons	8.3 %	12.5 %
	Organic peroxide – class II		10 pounds		10 pounds	(50)(2) = 100 pounds	10 %	12.5 %
Fourth floor – area 3	Flammable liquid – class IA	2 gallons		2 gallons	4 gallons	(30)(2) = 60 gallons	6.7 %	12.5 %
	Organic peroxide – class II	35 pounds			35 pounds	(50)(2) = 100 pounds	35.0 %	12.5 %

NOTE:

* The designation of all control areas is indicated in column 1 with the **Material type and Class** being indicated in column 2. It is very important to indicate the material type and class of the materials in order to properly use this "sub-worksheet".

- * The values within columns 3, 4, and 5 are the amount of hazardous materials that the building and control areas are being designed for. This information comes from the information provided by the designer/owner. ***It should also be noted that the values within each of the above referenced columns should be less than the associated values of Tables 307.7(1) and 307.7(2) for the hazardous materials and it's use.***
- * The maximum amount of hazardous materials permitted in a control area is based on the purpose of the hazardous materials (i.e. for storage, use in closed systems, or use in open system) and the material itself. The permitted maximum amount of hazardous materials may be increased from what is indicated in Tables 307.7(1) and 307.7(2) by use of the applicable footnotes referenced in the Tables. As per footnote b, of Table 307.7(1) the aggregate quantity of hazardous materials in utilization and storage shall not exceed the quantity listed for storage. As in the example above the permitted maximum amount of flammable liquid - class IA is 30 gallons (for storage purpose) modified by a factor of 2 based on footnote d, of Table 307.7(1).
- * The maximum amount of materials permitted (column 7) should be greater than the total of materials present in the control area (column 6). If the value in column 7 is not greater than the value within column 6, then the building must be designed to comply with all requirements of section 415 of the IBC or the control areas need to be redesigned. In this example area 1 of the first floor for flammable liquid IA and organic peroxide class II and area 3 of the first floor for flammable liquid IA is not in compliance with the Code. The amount of hazardous materials within the control area is greater than maximum amount of flammable liquid permitted. *Some possible corrections to this violation may include;*
 - Reducing the amount of material being stored in control area,
 - Store materials in containers complying with the requirements of the IFC {thus allowing the permitted value of hazardous materials to be increased based on footnote e, of Table 307.7(1) where applicable}, or
 - Design the building per section 415 of the IBC as a hazardous occupancy.
- * **Please be reminded that in addition to checking the total amount of hazardous materials within the control area, the amount of hazardous material for each use within the control area must also be checked.** This "Control Area Sub-worksheet" only looks at the combined capacity of the hazardous materials and does not do a check on the amount of hazardous materials based on the use of the materials. **The values within columns 3, 4, and 5 should be less than the associated values of Tables 307.7(1) and 307.7(2) for the hazardous materials and it's use. If any of the values within columns 3, 4 or 5 are greater than the associated values within Tables 307.7(1) or 307.7(2), the building must be designed to comply with all requirements of section 415 of the IBC or the control areas need to be redesigned.**
- * The final comparison that is made is column 8 to column 9. The percentages within column 8 must be less than the percentages within column 9. If the percentages within column 8 are greater than the percentages within column 9 then the building must be designed per section 415 of the IBC or the control areas need to be redesigned. In this example the following areas are in violation of the code:
 - Area 1 of the first floor for the flammable liquid and organic peroxide,
 - Area 3 of the first floor for the flammable liquid material,
 - Area 1 of the fourth floor for the flammable liquid and organic peroxide materials, and
 - Area 3 of the fourth floor for the organic peroxide material.*Some possible corrections to this violation may include:*
 - Reducing the amount of material being stored in control area,
 - Store materials in containers complying with the requirements of the IFC {thus allowing the permitted value of hazardous materials to be increased based on footnote e, of Table 307.7(1) where applicable},

or

Design the building per section 415 of the IBC as a hazardous occupancy.